

# PATENT ABSTRACTS OF JAPAN

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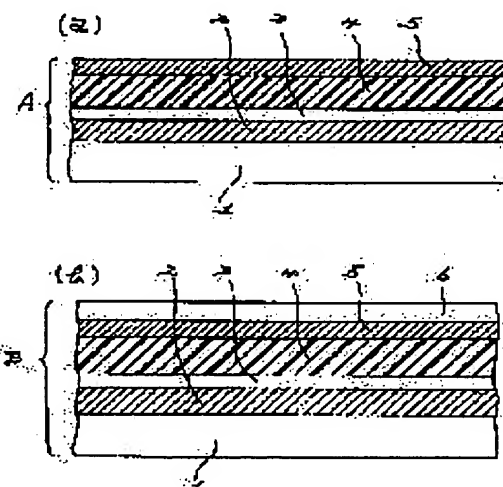
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## (54) PRINTING RECORDING SHEET HAVING THERMAL BREAKDOWN RECORDING LAYER

(57)Abstract:

**PURPOSE:** To enable recording display due to a plurality of colors without using thermal ribbons corresponding to the number of colors when recording display due to hue displays of a plurality of colors is performed on a recording sheet by a thermal head.

**CONSTITUTION:** A printing recording sheet having a thermal breakdown recording layer is characterized by laminating a substrate colored layer 2, a metal vapor deposition layer 4 and a surface colored layer 5 on the surface of a base sheet 1 in this order and, if necessary, laminating a transparent protective layer 6 on the surface colored layer.



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CLAIMS

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[Claim(s)]

[Claim 1] The printing record sheet which has the substrate coloring layer 2, the metal vacuum evaporation layer 4, the surface coloring layer 5, and the thermal runaway recording layer characterized by carrying out the laminating of the transparent protection layer 6 to this surface coloring layer in this order if needed on the front face of the base material sheet 1.

[Claim 2] The printing record sheet which carries out the laminating of the transparent protection layer 6 to this surface coloring layer in this order the substrate coloring layer 2, the metal vacuum evaporation layer 4, the surface coloring layer 5, and if needed, and has the thermal runaway recording layer characterized by carrying out the laminating of the mold release sheet 8 to the rear face of said base material sheet 1 through the binder layer 7 or this binder layer 7 at the front face of the base material sheet 1.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the printing record sheet which has the thermal runaway recording layer which carried out the laminating of the thermal runaway recording layer by the metal vacuum evaporation layer to the inner layer.

[0002]

[Description of the Prior Art] Conventionally, there is an imprint recording method which records on a printing record sheet by performing a desired coloring pattern and coloring printing on this sheet, using a thermal head (thermal print head for thermal recording by the dot-matrix-like flat-surface heating element or the stroke pin method dot heating element), the thermal-ink-transfer-printing ribbon for coloring (thermal ribbon), and the sheet for record (record form) as a method which uses a record print head and carries out record printing.

[0003] The roll-like sheet 22 (record form) for record with which drawing 5 was the outline side elevation showing an example of the conventional thermal-ink-transfer-printing recording method, the thermal-ink-transfer-printing recording device 20 began to roll suitably, and the shaft 21 was equipped each which has been arranged along the \*\*\*\*\* top of the sheet 22 for record which begins to wind by infeed roll 21a etc. suitably, and began to be rolled -- to a thermal head 25 and the 26 (thermal head of a flat-surface heating element which arranged two or more thermal dots regularly in the shape of a matrix) down side Beginning to roll the roll-like thermal ribbons 23 and 24 respectively, make the coloring imprint layers 23a and 24a counter the sheet 22 side for record, and they are sent in. The inside of two or more thermal heads (not shown) of said thermal heads 25 and 26, Exoergic actuation of the desired thermal dot is carried out, and it is the thing of the thermal ribbons 23 and 24 which carries out the sequential heating imprint of the coloring imprint layers 23a and 24a at a record pattern configuration, respectively, and prints the coloring printing 23b and 24b, respectively at the 22nd page of the sheet for record.

[0004]

[Problem(s) to be Solved by the Invention] In order to record on the sheet 22 for record by using the color tone of two or more colors by the above-mentioned recording method The thermal ribbon 27 of two or more colors corresponding to it is needed. Setting between two or more thermal ribbon 27, And while delivery \*\*\*\*\* of the new coloring side of the thermal ribbon 27 which is mutually adjusted to delivery \*\*\*\* of the sheet 22 for record etc. is required and requires setting time, recording devices, such as a ribbon delivery device including thermal heads 25 and 26, become large-scale.

[0005] In case this invention performs a record display on the sheet for record by the color tone display of two or more colors by the thermal head, it is to enable the record display in two or more colors, without using the thermal ribbon of the number corresponding to the color number.

[0006]

[Means for Solving the Problem] Invention of the 1st of this invention is a printing record sheet which has the substrate coloring layer 2, the metal vacuum evaporation layer 4, the surface coloring layer 5, and the thermal runaway recording layer characterized by carrying out the laminating of the transparent protection layer 6 to this surface coloring layer in this order if needed on the front face of the base material sheet 1.

[0007] Invention of the 2nd of this invention is a printing record sheet which has the thermal runaway recording layer characterized by having carried out the laminating of the transparent protection layer 6 to this surface coloring layer in this order the substrate coloring layer 2, the metal vacuum evaporation layer 4, the surface coloring layer 5, and if needed, and carrying out the laminating of the mold release sheet 8 to the rear face of said base material sheet 1 through the binder layer 7 or this binder layer 7 at the front face of

the base material sheet 1.

[0008]

[Example] If the printing record sheet of this invention is explained to a detail according to the sectional side elevation of printing record sheet A in one example of this invention shown in drawing 1 (a), a synthetic-resin film, such as thermoplastics, such as polyethylene terephthalate, polypropylene, and a polyvinyl chloride, or thermosetting polyester resin, will be used, or the base material sheet 1 will be a compound sheet of paper or paper, and a synthetic-resin film.

[0009] Although 15 micrometers - about 100 micrometers are suitable for it when using a printing record sheet as a roll-like record printing tape, and 100 micrometers - about 300 micrometers are suitable for the thickness of the above-mentioned base material sheet 1 when using it as the shape of the shape of a sheet, and a card, especially in this invention, it is not limited to this.

[0010] All over the, in the shape of solid one, the printing ink of the printing ink of various color tones, such as white, blue, green, yellow, and red, or cyanogen, a Magenta, and yellow is used for the front face of this base material sheet 1, and the substrate coloring layer 2 is given to it by printing methods, such as a gravure method or an offset-printing method, and a screen-stencil method. Or in the front face of this base material sheet 1, it is also possible partially to use the above-mentioned printing ink the shape of a line drawing pattern and in the shape of [ which has shade gradation using a halftone dot ] a pattern, and to give the substrate coloring layer 2 suitably. In addition, as for the printing ink used for printing of the above-mentioned substrate coloring layer 2, it is desirable to use what has thermal resistance comparatively.

[0011] On the above-mentioned substrate coloring layer 2, it has the anchor coat layer 3 with the transparent thickness of 0.05mm - about 0.5mm, and while making good an adhesive property with the metal vacuum evaporation layer 4 by which a laminating is carried out on it to behind, it is considering as the middle resin layer between the metal vacuum evaporation layers 4 by which a laminating is carried out to this substrate coloring layer 2 and its bottom.

[0012] As this anchor coat layer 3, thermoplastic (thermofusion nature) synthetic resin, such as a polyvinyl chloride, polystyrene, and an acrylic, can be used, and adhesive good isocyanate system resin (for example, polyurethane resin) with a metal, epoxy system resin, ketone system resin, etc. can be used.

[0013] On this anchor coat layer 3, the metal vacuum evaporation layer 4 obtained by carrying out vacuum deposition of the metals, such as aluminum and tin, is given. This metal vacuum evaporation layer 4 is equipped with the heating easy breakability of extent easily fused with heating around 180 degrees C - 250 degrees C. The thickness On the melting point of the metal vacuum evaporation layer 4 heated by pinpoint heating actuation described later The thickness which is extent which the deficit field (metal vacuum evaporation layer aperture) by condensation of molten metal produces, and the lower layer substrate coloring layer 3 appears is required, and the range of  $1 \times 10$  to 4 micrometer to  $1 \times 10$  to 1 micrometer is suitable for the vacuum evaporation thickness.

[0014] In addition, what is presenting the color tone (for example, silver) of the metal itself vapor-deposited, or colored the front face with the coating or printing ink of a color tone suitably is sufficient as this metal vacuum evaporation layer 4. Moreover, although it is desirable that it is in a smooth front face with gloss with the sufficient light reflex engine performance in comparison or the smoothest possible mirror plane condition as for the front face of the metal vacuum evaporation layer 4, it may be presenting the split-face condition (optical diffusibility) of proper granularity depending on the case.

[0015] this metal vacuum evaporation layer 4 top -- the part of the whole surface of the front face, or its front face -- the shape of solid one -- or the surface coloring layer 5 is given by printing methods, such as a gravure method, an offset-printing method, and a screen-stencil method, in the shape of [ which has shade gradation using the shape of a line drawing pattern, and a halftone dot suitably ] a pattern.

[0016] The printing ink with which the lower layer metal vacuum evaporation layer 4 has the transparency of extent which penetrates this surface coloring layer 5 and is visible can be used for the printing ink used for printing of the surface coloring layer 5.

[0017] Moreover, the printing ink used for printing of this surface coloring layer 5 It has the melting point of extent easily fused by pinpoint heating actuation (heating actuation of 180 degrees C - about 250 degrees C) by the thermal dot of a thermal head. And in the condensation metal of the metal vacuum evaporation layer 4 fused by pinpoint heating actuation, the surface coloring layer 5 is incorporated in one, it is printing ink which is extent which a deficit aperture produces in this surface coloring layer 5, and usual printing ink can be used for it.

[0018] Drawing 1 (b) is the sectional side elevation of printing record sheet B of other examples in the printing record sheet of this invention. On the surface coloring layer 5 of said printing record sheet A shown

in one example of drawing 1 (a) It is the printing record sheet which formed the transparent surface protective layer 6. For example, a polyvinyl chloride, The laminating of the transparent surface protective layer 6 using thermoplastics, such as polyvinyl chloride-vinyl acetate copolymer resin, polyolefine system resin, and polyester system resin (saturated polyester, unsaturated polyester), heat bridge formation hardenability resin, or these mixed resin is carried out.

[0019] It is the sectional side elevation of printing record sheet C of the example of others in the printing record sheet of this invention, and at the rear face of the base material sheet 1 of printing record sheet B in other examples shown in drawing 1 (b), drawing 2 gives the binder layer 7, it can enable temporary adhesion of the exfoliation of the mold release sheet 8, and can use it for this binder layer 7 as adhesive tape, a pressure sensitive adhesive label, etc.

[0020] The printing record sheet of this invention shown in above-mentioned drawing 1 (a), drawing 1 (b), and drawing 2 , respectively By pinpoint heating actuation of a thermal dot in which the thermal head of a record printer was heated, the metal vacuum evaporatio layer 4 and the surface coloring layer 5 of the upper layer or this metal vacuum evaporatio layer 4, the surface coloring layer 5 of the upper layer, and the surface protective layer 6 Melting destruction is carried out at the shape of a predetermined pattern, and it indicates by record with the field of the destroyed shape of the pattern.

[0021] If the example in the case of recording predetermined information on printing record sheet C (pressure sensitive adhesive label which?equipped the rear face with the binder layer 7) of this invention shown in above-mentioned drawing 2 using the heating printer equipped with the thermal head 13 according to drawing 3 is explained To surface protective layer 6 front face of printing record sheet C, two or more thermal dots 14 which carry out heating actuation electrically based on a predetermined recording information signal (for example, a printing font signal or a pattern font signal) are regularly arranged in the shape of a matrix at one flat surface. and this printing record sheet C side -- contiguity or contact thru/or alienation -- the thermal head 13 which carries out output actuation with the flat-surface heating element method which can operate is confronted.

[0022] Based on a recording information signal, heating actuation of the predetermined thermal dot 14b is carried out among thermal dots 14 (thermal dots 14a, 14b, 14c, and 14d), and it approaches or operates [ contact ] on the front face of printing record sheet C which stands face to face against it.

[0023] The metal vacuum evaporatio layer 4 near thermal dot 14b and the surface coloring layer 5 (or the surface coloring layer 5, the surface protective layer 6) condense the molten metal of the metal vacuum evaporatio layer 4 to the metal vacuum evaporatio layer 4 side to which melting of the both sides is not carried out by fusing in pinpoint by heating actuation of this thermal dot 14b, and aperture 12a of the metal vacuum evaporatio layer 4 is formed.

[0024] From the metal vacuum evaporatio layer 4, a part is incorporated by molten metal by melting, the surface coloring layer 5 (or the surface coloring layer 5, the surface protective layer 6) in the upper layer is also made and destroyed, aperture 12b of the surface coloring layer 5 is formed, and the record display 12 is obtained by the above-mentioned apertures 12a and 12b.

[0025] Thus, it is exposed of the lower layer substrate coloring layer 2 to the record display 12 displayed on this printing record sheet C, the two-color display by this substrate coloring layer 2 and the surface coloring layer 5 or this substrate coloring layer 2, the surface coloring layer 5, and this surface coloring layer 5 are spaced through it, and the trichromatic specification by the color tone of the lower layer metal vacuum evaporatio layer 4 is obtained.

[0026] In addition, the above-mentioned record actuation can be similarly carried out about the printing record sheets B and C of this invention.

[0027] Drawing 4 equips the thermal recording printer 10 with printing record sheet C of this invention. It is the general drawing which explains the record actuation in the case of indicating by record to this sheet. To sheet volume \*\*\*\*\* 11 of the thermal recording printer 10 Carry out support wearing of roll-like printing record sheet C, and it lets out this sheet C to the location which stands face to face against a thermal head 13 with an infeed roll (not shown) suitably. By the thermal dot 14, this sheet C side is heated in pinpoint, and the record display 12 is formed.

[0028] Said thermal head 13 operates based on font signals for a printing display, such as an alphabetic character, a figure, and a notation, and the font signal for pattern displays, 15 is a display-font signal decoder, and 16 is a record actuation control means which carries the predetermined recording information memory (internal memories, such as external memory, such as a floppy disk, a magnetic tape, and an optical disk, and ROM) to which control action of this decoder 15 is carried out.

[0029] In addition, although record printing by two or more color specification can do the printing record

sheet of this invention, without using a thermal ribbon, if the need is accepted, it is possible to use together the thermal ribbon currently used conventionally and to carry out two or more color printing, and it is also possible to use the thermal head by the stroke pin method.

[0030]

[Function] Since the printing record sheet of this invention is equipped with the easy-breakable metal vacuum evaporatio layer 4 which fuses with heat to the inner layer, and is punctured to it and the lower layer and the upper layer of the metal vacuum evaporatio layer 4 were equipped with the substrate coloring layer 2 and the surface coloring layer 5, respectively By pinpoint heating actuation, by carrying out heating actuation to the shape of a record pattern of a request of a printing record sheet front face The metal vacuum evaporatio layer 4 of a part and upper layer beyond it which were heated carry out a thermal runaway, and an aperture 12 is formed in this printing record sheet front face in the shape of a predetermined record pattern. By it Record printing of the pattern with which it was indicated by coloring or the predetermined pattern by the substrate coloring layer 2 was displayed on the predetermined color tone by the substrate coloring layer 2 in the aperture 12 lower layer is carried out.

[0031] Therefore, the printing record sheet of this invention can perform record printing by two or more color specification by the surface coloring layer 5, the metal vacuum evaporatio layer 4, and the substrate coloring layer 2.

[0032] Moreover, since the laminating of the mold release sheet 8 was suitably carried out through the binder layer 7 or this binder layer 7, it can use for the rear face of this printing record sheet as the adhesive tape with which record printing of the patterns, such as a desired alphabetic character, a notation, and a figure, was carried out, the various labels for a display, the tape for a package, a label for a package, etc.

[0033]

[Effect of the Invention] The printing record sheet of this invention The color tone of the surface coloring layer of a printing record sheet front face, By being able to perform the display of two or more color tones depended on the color tone of a metal vacuum evaporatio layer, and carrying out the thermal runaway of the upper layer to the shape of a request pattern from a metal vacuum evaporatio layer, and making a sheet front face expose a lower layer substrate coloring layer Without using the thermal ribbon of the color number corresponding to the color number like before which should indicate by record The color tone of the substrate coloring layer, the alteration of a record display by which can perform the record display of two or more colors by the color tone of said surface coloring layer and the color tone of a metal vacuum evaporatio layer, and could use as the printed matter for [ various ] information offer, a card, a label, a tape, etc., and thermal recording was carried out is difficult -- etc. -- it is effective.

[0034] Like before, mutual delivery adjustment, such as delivery \*\*\*\*\* of the new coloring side of a thermal ribbon to mutual setting of the thermal ribbon of two or more colors and delivery \*\*\*\* of the sheet for record, is unnecessary, and there is effectiveness, like compaction of ribbon setting time and the miniaturization of recording devices, such as a ribbon delivery device including a thermal head, are attained.

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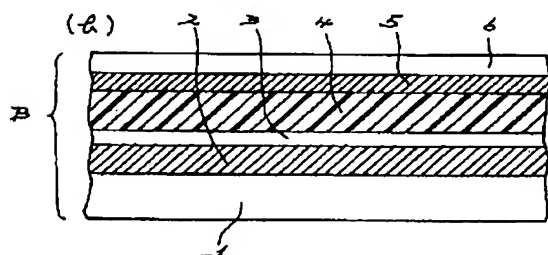
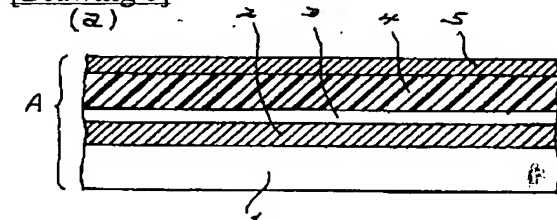
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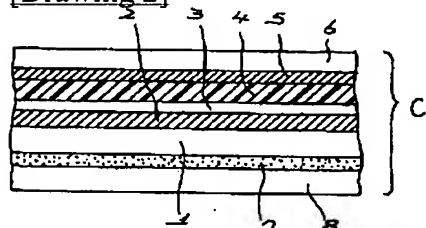
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## DRAWINGS

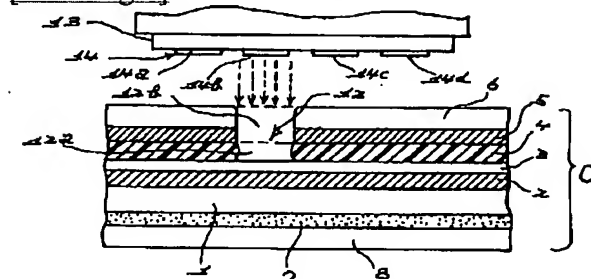
[Drawing 1]



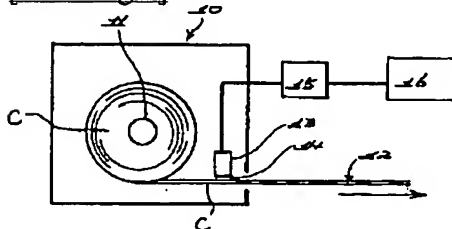
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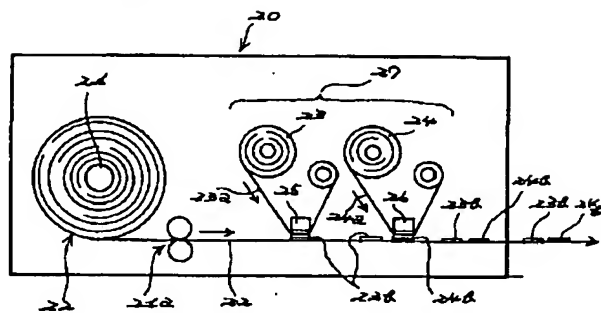
[Drawing 3]



[Drawing 4]



[Drawing 5]



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